

A Review Paper on Internet of Things Based Pre Fall Detection Wearable device

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Abstract: As we all are aware we are living in the era of the 4G technology where everyone is using internet of things in their daily lives. Now a days internet of things became our requirement. We are using various applications of internet. According human beings are liking internet of things based wearable devices for several applications. In this paper basically we talk about the progress and demand of internet of things on current era with their application in pre fall detection. Here we have done a deep study on most of the existing pre fall techniques by former researchers. Requirement of wearable device based pre fall detection will help us to avoid the serious head injuries.

Index Terms: IoT, Pre Fall, NRF24L01, BEL, Atmel.

I. INTRODUCTION

Internet of Things (IoT) is the augmentation of current internet which is providing correspondence, association and internetworking between different gadgets or physical items or otherwise called as “things”. IoT term speaks a general idea for the capacity of system gadgets to detect and gather information from our general surroundings, and afterward share that information over the internet where it very well may be handled and used for various fascinating purposes. The IoT is involved savvy machines connecting and speaking with different machines, articles, conditions and foundations. Presently multi day’s each individual are associated with one another utilizing loads of correspondence way. Where most well-known correspondence way is internet so in another word we can say internet which interface people groups[9].

The internet of things can be characterized as interfacing the different sorts of articles like advanced cells, PC and tablets to web, which acquires extremely novel kind of correspondence among things and individuals and furthermore between things[2].With the presentation of IoTs, the innovative work of home robotization are getting to be famous in the ongoing days. A considerable IoT of the gadgets are controlled and observed for helps the individual. Also different remote advances help in interfacing from remote spots to enhances the insight of home condition .A propelled system of IoT is being framed when an individual need associating with different things. IoTs innovation is utilized to come in with inventive thought and incredible development thought for savvy homes to enhance the expectations for everyday comforts of life. Internet encourages us to acquire with quick answer for some issues and furthermore ready to associate from any of the remote spots which adds to by and large cost decrease and vitality utilization [3].Lately, there has been a developing enthusiasm among purchasers in the savvy home idea. Home mechanization speaks to and reports the status of the associated gadgets in a natural, easy to use interface enabling the client to cooperate and control different gadgets with the pinch of a couple catches. A portion of the significant correspondence innovations utilized by the present home robotization system incorporate Bluetooth, Wi-MAX and LAN (Wi-Fi),ZigBee and global system for mobile communication (GSM)[1]. Here we are utilizing Wi-Fi module. It offers the client complete access control of the machines through a remote interface. Robotization is the utilization of control systems and data innovation to control gear, modern apparatus and procedures, lessening the requirement for the human mediation [2] .

Today we are seeing the charge of our general surroundings. Practically any produced an implanted great presently incorporates an implanted processor (normally a microcontroller or MCU), alongside UIs, that can include programmability and deterministic “direction and control” usefulness. The jolt of the world and inescapability of inserted preparing are the keys to making objects “keen”. Your old toaster that mechanically controlled the shade of your toast presently has a MCU in it, and the MCU controls the shade of your toast. The toaster finishes its undertaking all the more reliably and dependably, and in light of the fact that it is currently a savvy toaster, it can speak with you electronically utilizing its touchpad or switches. After a gadget ends up savvy through the combination of installed preparing, the following consistent advance is remote correspondence with the keen gadget to help make life less demanding. For instance, on the off chance that I am running late at the workplace, would i be able to turn on my home lights for security reasons utilizing my workstation or cellphone?

Correspondence ability and manual remote control lead to the following stage...how can mechanize things and in view of my settings and with refined cloud-based preparing get things going without my mediation? That is a definitive objective of some IoT applications. Furthermore for those applications to interface with and use the internet to accomplish this objective, they should initially move toward becoming “shrewd” (join a MCU/inserted processor with a related special ID) at that point associated and at long last controlled. Those capacities would then be able to empower another class of administrations that makes life less demanding for their clients[1].

The term internet of things was first authored by Kelvin Ashton in 1999 with regards to the store network the board. Notwithstanding, in the previous decade, the definition has been progressively comprehensive covering wide scope of uses like mechanical services, utilities, transport, and so forth. Despite the fact that meaning of “Things” has changed as innovation developed,

the primary objective of seeming well and good data without the guide of human intercession continues as before. An extreme advancement of the present internet into a network of interconnected items that not just collects data from nature (sensing) and associates the physical world (incitation/order/control). Yet in addition utilizes existing internet principles to give administrations to data exchange, investigation, applications and correspondences. Powered by the commonness of gadgets empowered by open remote innovation for example Bluetooth, radio recurrence recognizable proof (RFID), Wi-Fi and telephonic information benefits just as inserted sensor and actuator hubs. IoT has ventured out of its early stages and is nearly changing the present static internet into a completely incorporated future internet. The internet unrest prompted the interconnection between the individuals at an exceptional scale and pace. The following unrest will be the interconnection between items to make a keen domain. Just in 2011 did the quality of interconnected gadgets on the planet surpass the real number of individuals. Right now there are 9 billion interconnected gadgets and it is relied upon to achieve 24 billion gadgets by 2020[3].

Pre fall detection

Fall is a standout amongst the most paltry reasons causing injuries and genuine wounds (for example bone breaks or horrible mind harms brought about by head injuries)[1,2]. Old individuals are probably going to fall and they frequently have more genuine outcomes in the wake of falling than individuals of different ages. As indicated by insights, 30% of those more than 65 and half of those more than 80 years of age fall each year with risky outcomes[1]. On account of high dreadiness (practically 20% of fall lead to genuine injuries), about 40% of all nursing home confirmations are identified with fall[3]. Treatment of wounds from a frequently keeps going over a significant lot of time and is especially exorbitant (for example 30,000 US dollars for a genuine case in emergency clinic) [4,5]. The extent is as per the following :63% of fall-related costs represents hospitalizations, 21% is for crisis office visits and 16% is for outpatient visits. Be that as it may, in spite of the high hugeness of the issue, opportune guide is just conveyed in half of the cases. Unreported cases lead to the decay of damage which may confuse medications later. Dread of falling enhances the negative post fall results and may diminish patient's certainty [6]. Subsequently, it confines the patient's exercises, decreases social connections and in the end causes misery [7,8]. In this way, there is a critical need of fall recognition systems. A snappy reaction to the episode may diminish the danger of genuine results after a fall. Correspondingly, it diminishes treatment costs and to expand possibility of recuperation. In [9], creators have isolated fall recognition systems into three gatherings dependent on wearable gadgets, feeling sensors and cameras. Systems dependent on wearable gadgets appear to progressively prevalent in light of the fact that they can identify a fall all the precisely paying little mind to the patient's area (for example indoor and open air) and don't meddle the patient's protection and everyday exercises. Wearable gadgets frequently procure parameters identified with movement, for example, speeding up, revolution and the heading of movement[10]. It is a test for wearable sensor hubs to separate between fall occasions and easygoing everyday exercise or to inform specialists progressively. Because of their asset limitations (for example restricted power and capacity limit), it is required to have a propelled system which lessens.

II. LITERATURE REVIEW

Here we present the previous existing work in the field of Internet of things & pre fall detection based devices:

What the Internet of Things (IoT) needs to become a reality, 2013:

In this paper author discusses the another period of processing innovation that many are calling the Internet of things (IoT). Machine to machine, machine to system, machine to condition, the internet of everything, the internet of intelligent things, insightful system call it what you need, yet it's going on, and its potential is tremendous. Author see the IoT as billions of shrewd, associated "things" (a kind of "all inclusive worldwide neural system" in the cloud) that will incorporate each other of our lives, and its establishment is the insight that inserted gives. The IoT contained savvy machines associating and speaking with different machines, articles, conditions and systems. accordingly, enormous volumes of information are being created and that information is being handled into valuable activities that can "order and control" things to make our lives a lot less demanding and more secure and to decrease our effect on nature.

Research direction for the internet of things, 2014:

In this paper author discusses the numerous specialized networks are vivaciously seeking after research themes that add to the Internet of Things (IoT). Today, as detecting, activation, correspondence, and control turn out to be perpetually advanced and universal, there is critical cover in these networks, in some cases from somewhat alternate points of view. More participation between networks is energized. To give a premise to examining open research issues in IoT, a dream for how IoT could change the world in the Inaccessible future is first exhibited. At that point, eight key research subjects are counted and investigate issues inside those themes are talked about.

Internet of Things (IoT): A vision, architectural elements and future directions, 2013:

In this paper author discusses the ubiquitous detecting empowered by wireless sensor Network (WSN) innovations cuts crosswise over numerous over numerous zones of cutting edge living. This offers the capacity to quantity, deduce and comprehend ecological markers, from sensitive ecologies and common assets to urban conditions. The multiplication of these gadgets in an imparting activating system makes the Internet of Things (IoT), wherein, sensors and actuators mix flawlessly with nature around us, and the data is shared crosswise over stages so as to build up a typical working picture (COP). Fuelled by the ongoing adjustment of an assortment of empowering gadget advances, for examples RFID labels and perusers, close field correspondence (NFC) gadgets and inserted sensor and actuator hubs, the IoT has ventured out of its outset and is the following progressive innovation in changing the internet into a completely coordinated future internet. As we move from www (static pages web) to web2 (interpersonal interaction web) to web3 (pervasive figuring web), the requirement for information on-request utilizing modern natural questions increments essentially. This paper shows a cloud driven vision for overall usage of Internet of Things. The key empowering advances and application spaces that are probably going to drive IoT investigate soon are talked about. A cloud execution utilizing Aneka, which

depends on connection of private and open mists is displayed. We finish up our IoT vision by developing the requirement for intermingling of WSN, the internet and circulated registering coordinated at mechanical research network.

The use of mobile devices with multi-tag technologies for an overall contextualized vineyard management,2009:

This paper depicts a viticulture service-oriented system(VSOF) which pivots setting components or labels that are set in the field and which can be decoded by cell phones or PDAs. The labels are utilized to consequently relate a field area to the pertinent database tables or records and furthermore to get to relevant data or administrations. By indicating a cell phone a tag, the viticulturalist may download information, for example, climatic information or transfer data, for example, illness and bug rate basically, without giving directions or some other references and without coming back to a focal office. This work is a piece of a push to actualize a vast scale disseminated agreeable system in the Douro Demarcated Region in Northern Portugal, an area in which the exertion bodes well because of the amazingly factor geography and mesoclimates . the likelihood of trading contextualized data and getting to contextualized benefits in the field, utilizing understood gadgets, for example, mobile phones, may add to build the rate of selection of data innovation in viticulture, and to increasingly effective and closer-to-the-crops rehearses.

Risk factors for falls among elderly persons living in the community,1998:

To study risk factors for falling, we conducted a one year prospective investigation, using a sample of 336 persons at least 75 years of age who were living in the community. All subjects underwent detailed clinical evaluation, including standardized measures of mental status, strength, reflexes, balance, and gait; in addition, we inspected their homes for environmental hazards. Falls and their circumstances were identified during bimonthly telephone calls.

Challenges, issues and trends in fall detection systems,2013:

This work shows a board writing audit of fall identification frameworks, including examinations among different sorts of studies. It means to fill in as a kind of perspective for the two clinicians and biomedical architects arranging or leading field examinations. Difficulties, issues and patterns in fall discovery have been distinguished after the inspecting work. The quantity of studies utilizing setting mindful systems is as yet expanding however there is another pattern towards the incorporation of fall recognition into cell phones just as the utilization of machine learning strategies in the discovery calculation. We have additionally recognized difficulties with respect to execution under genuine conditions, ease of use and client acknowledgement just as issues identified with power utilization, constant activities, detecting restrictions, protection and record of genuine falls.

A survey on fall detection: principles and approaches, neurocomputing,2013:

In this paper author discusses, Fall location is a noteworthy test in the general medicinal services area, particularly for the older and solid reconnaissance is a need to moderate the impacts of falls. The innovation and items identified with fall location have dependably been in intense interest inside the security and the medicinal services ventures. A powerful fall discovery framework is required to give earnest help and to altogether lessen the therapeutic consideration costs related with falls. Here author give an extensive study of various frameworks for fall discovery and their fundamental calculations. Fall recognition approaches are partitioned into three fundamental classes: wearables gadget based, vibe gadget based and vision based. These methodologies are outlined and contrasted and one another and an end is inferred with a few exchanges on conceivable future work.

IoT-based Fall detection system with energy efficient sensor nodes,2016:

In this paper we examine vitality utilization of sensor hubs in an IoT-based fall discovery framework and present a plan of a redid sensor hub. What's more, we contrast the tweaked sensor hub and sensor hubs, based on universally useful advancement sheets. The outcomes demonstrate that sensor hubs dependent on sensitive tweaked gadgets are more vitality proficient than the others dependent on broadly useful gadgets while thinking about indistinguishable determination of small scale controller and memory limit. Moreover, our modified sensor hub with vitality proficiency choices can work ceaselessly as long as 35 hours. Energy efficient wearable sensor node for IoT-Based fall detection system,2018:in this work, they center around vitality proficiency of a wearable sensor hub in an Internet-of-things(IoT) based fall location framework. They actualizing the wearable gadget for IoT-Based fall recognition frameworks as far as vitality proficiency and nature of administration. As per there results there wearable gadget can be utilized constantly for 76 h with a 1000mAh li-particle battery.

III. RESEARCH GAP

As per all previous work , there is no any researcher who solve the most important and critical factors and they are :

Battery life: Smartly utilize the power consumption & increase the battery life.

Form factor: This is a serious problem as we know it's a wearable device but most of the design have the issue with its form factor.

Cost: If we are talking about the IoT device so cost a big problem for any IoT device, so there is no need of cost cutting which is not done by any researchers.

These all are the research gap where we can focus and try to reduce those problems.

IV. FUTURE RESEARCH OBJECTIVE

As we know IoT is large area where lots of sectors are involve. If we are talking about the pre fall detection & alert device so there is lots of area where we can explore and improve those like Smart power Management system and increase the battery life, Smartly utilize the component so the form factor will be small.

V. CONCLUSION

In this paper basically we are focusing on the previous existing approach. As we can see some previous existing technology which is based on BLE, NRF etc., these all technology are work on large size lithium battery which is approximately 1000mAh. These types of batteries are not at all good for all wearable devices like pre fall. As it will increase the of the entire device. Similar due to that

cost of the device will increase. As we can see here most of the research have used ATMEGA328 which is really not good for this type of application. So there is lots of scope in terms of future work.

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